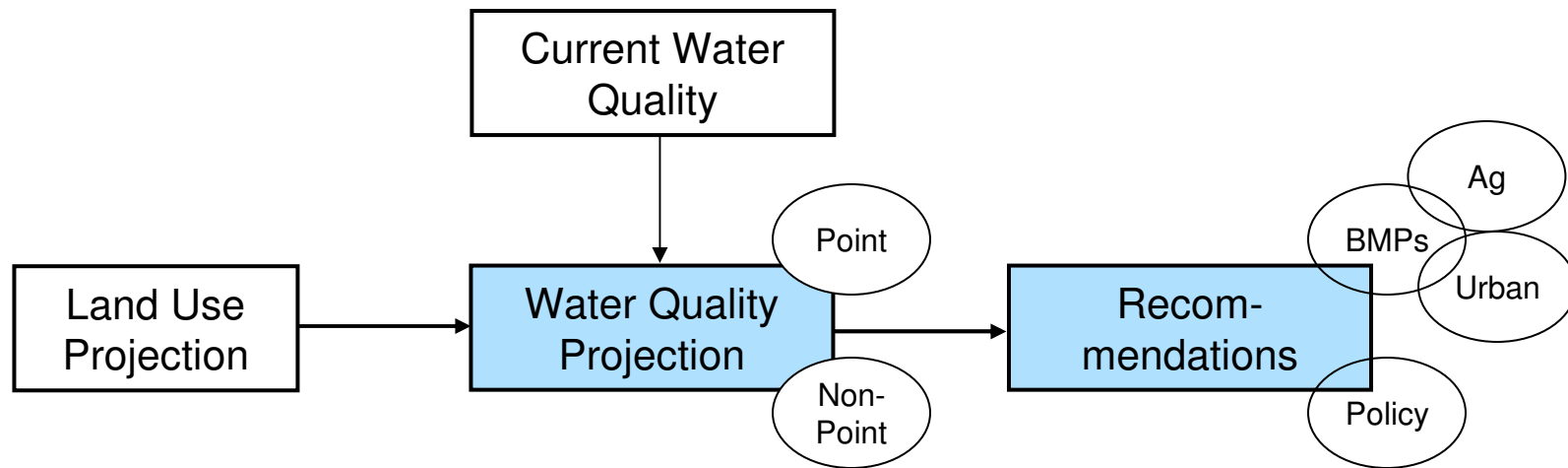




Chicago Metropolitan
Agency for Planning

**Pollutant Loading and Green Infrastructure in the
Upper Kishwaukee River Watershed
February 14, 2008**

Process



Understanding the project

- Two objectives:
 - Fix existing water quality problems
 - Prevent future problems
- Two main types of pollution:
 - Point source
 - Nonpoint source

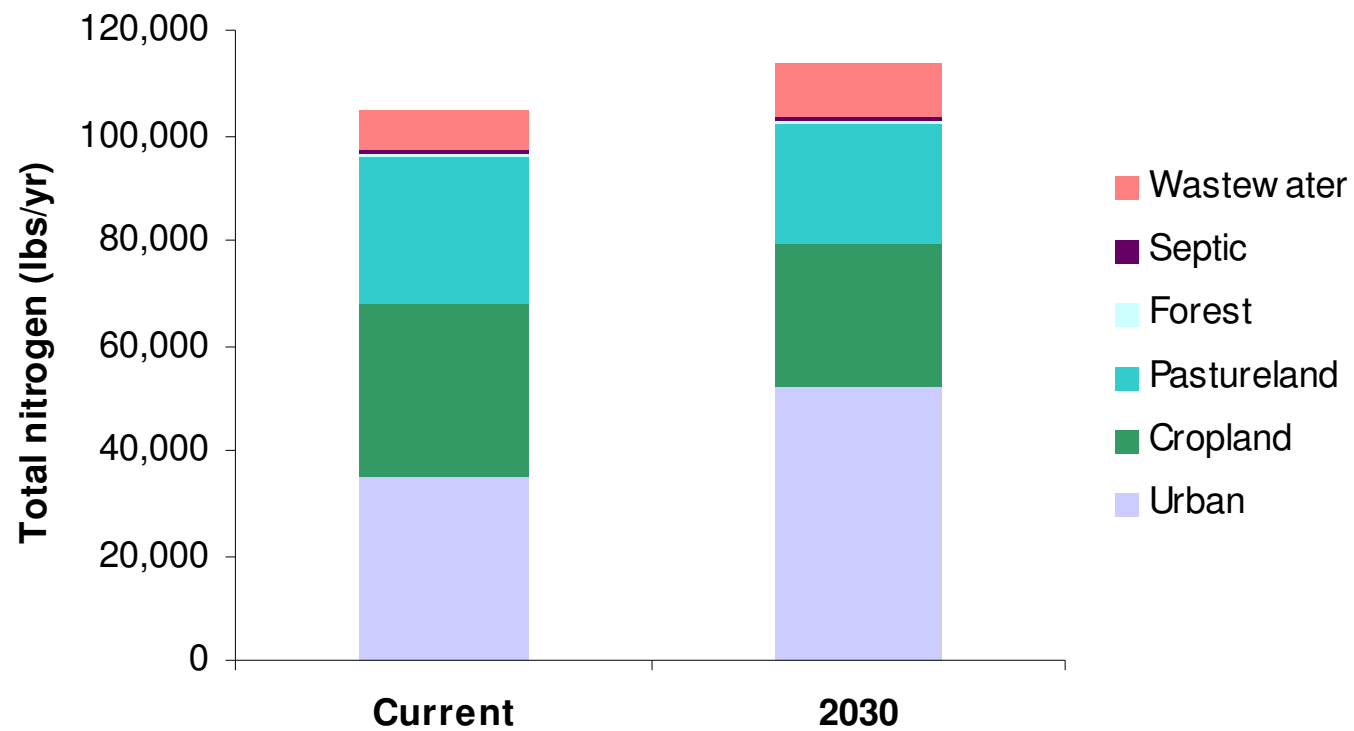
Model

- STEPL
 - [http://it.tetrattech-ffx.com/stepl/models\\$docs.htm](http://it.tetrattech-ffx.com/stepl/models$docs.htm)
- Estimates nonpoint loads and contribution by source
- Does *not* yield predictions of instream concentration or load duration
- Wastewater contribution calculated separately

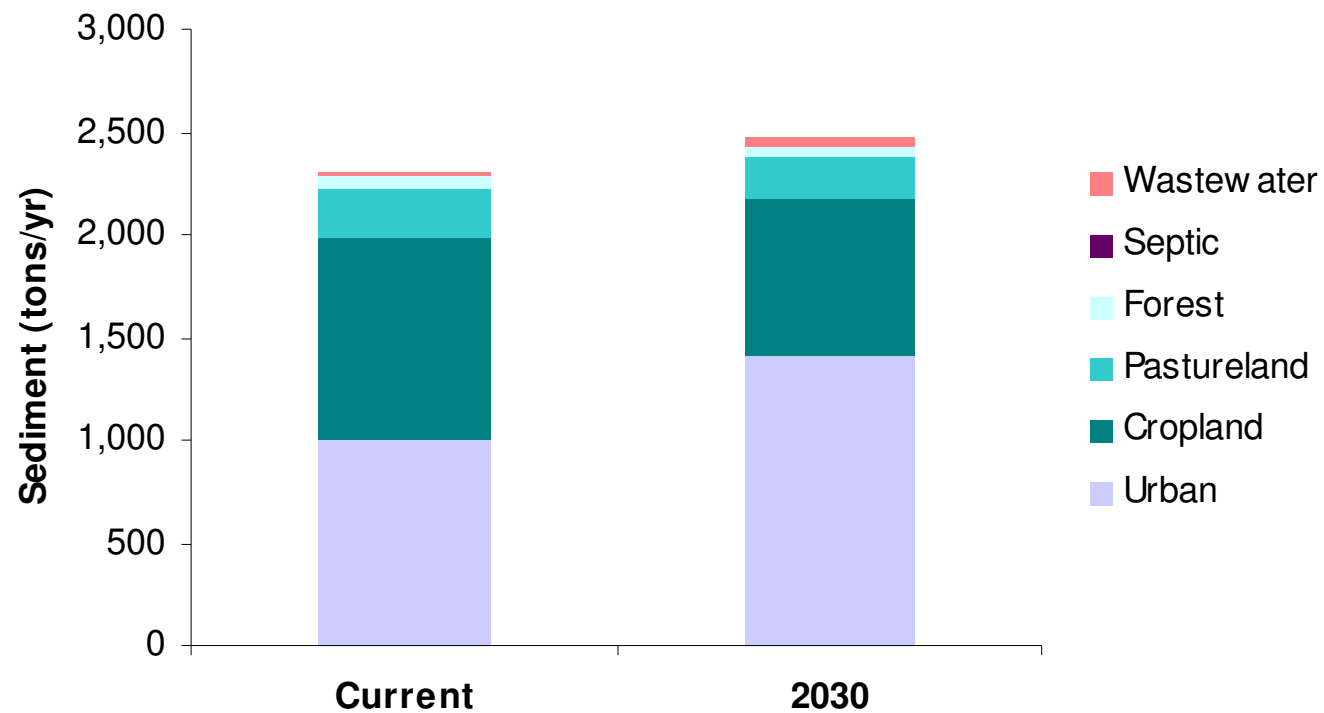
Causes of impairment

- Sedimentation
 - Total nitrogen
-
- Alteration to streamside and littoral vegetative covers (habitat alteration)
 - PCBs

Nitrogen



Sediment



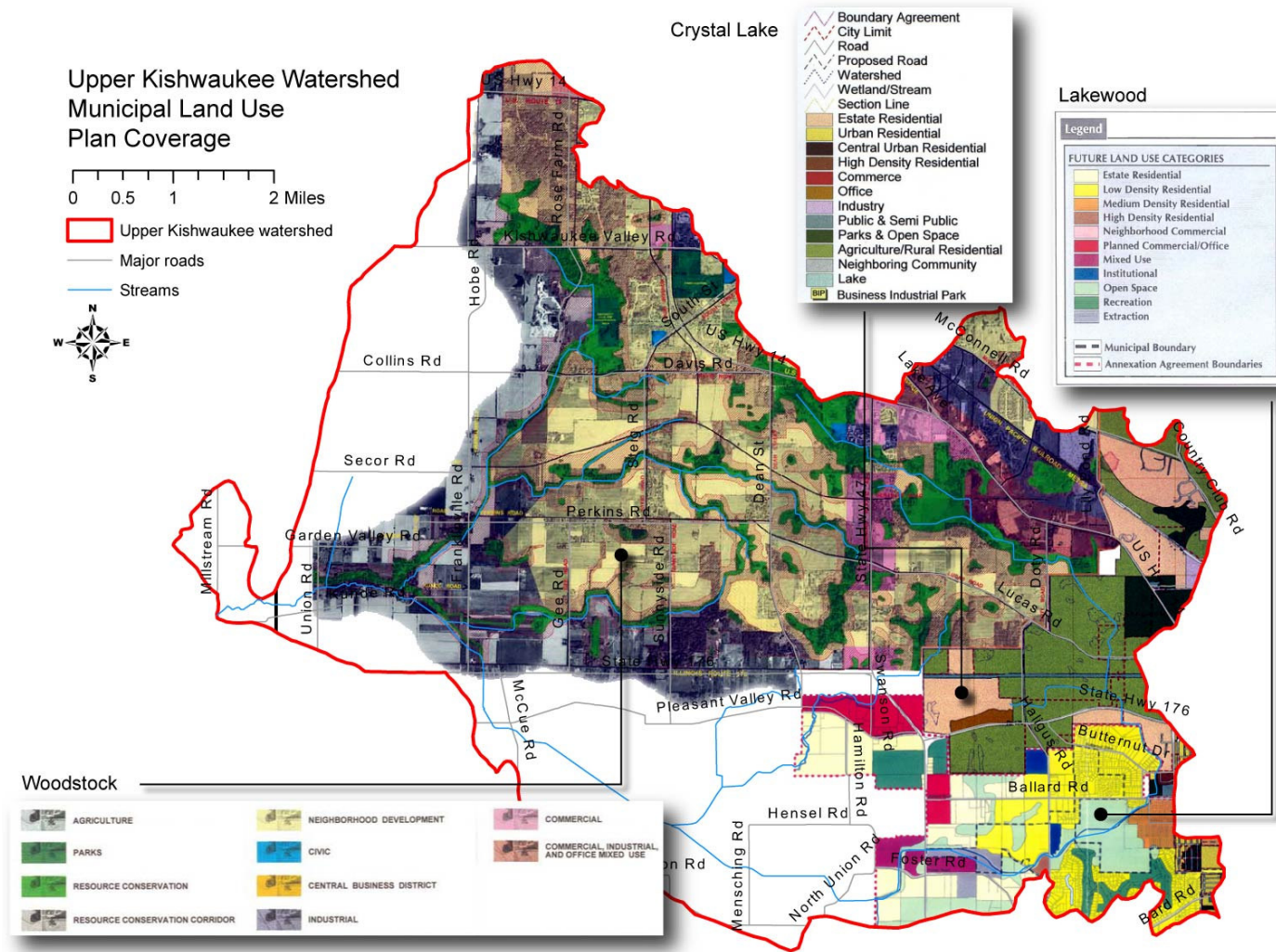
A rough estimate

- No load estimates for streambank or gully erosion
- Groundwater/subsurface flow contribution ignored

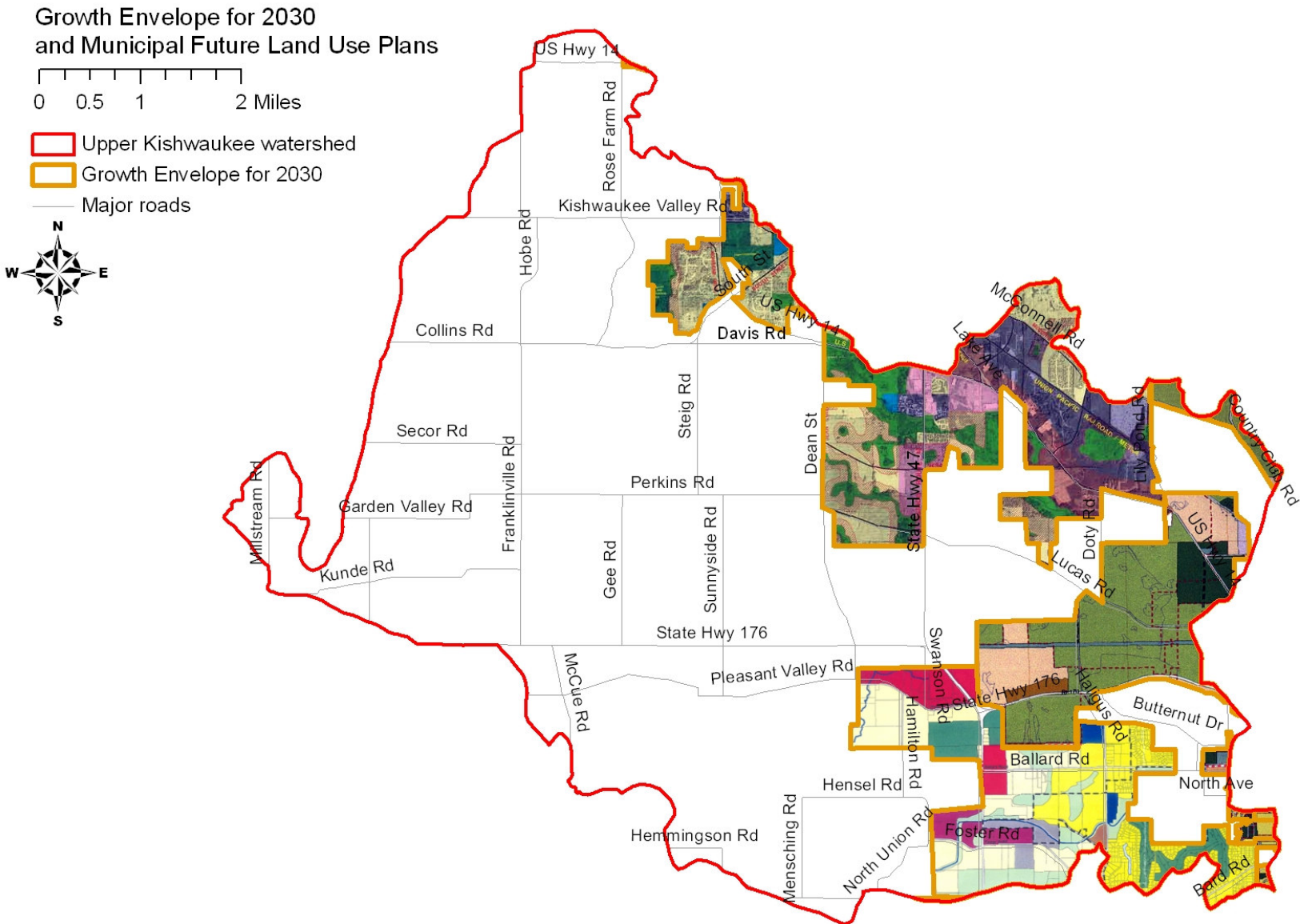
Consistency

Model	Annual Average Discharge (ac-ft)	Ratio	Annual Average Wastewater (ac-ft)	Total Discharge including wastewater (ac-ft)	Ratio including wastewater
STEPL	24,449	0.95	1,658	26,106	1.01
ISWS	25,773		(Included)		

Future land use in municipal comprehensive plans



Future land use in growth envelope



Growth Envelope

Municipality	Source of boundary
Woodstock	NIPC forecast, discussions with staff
Lakewood	Comprehensive plan
Crystal Lake	Comprehensive plan
Huntley	Not in watershed (NIPC forecast, discussions with staff)

Indicator of impairment

Org	Date	IBI
IEPA	2006	34
IEPA	2001	23
MCCD	2001	32
MCCD	2001	40
MCCD	2001	44
Huff and Huff	2003	40
Huff and Huff	2003	40
Huff and Huff	2003	34
Huff and Huff	2003	40
Huff and Huff	2003	40

Mean = 37 ± 3.5 (95% confidence)
Median = 40

Change needed = 11 to 22%

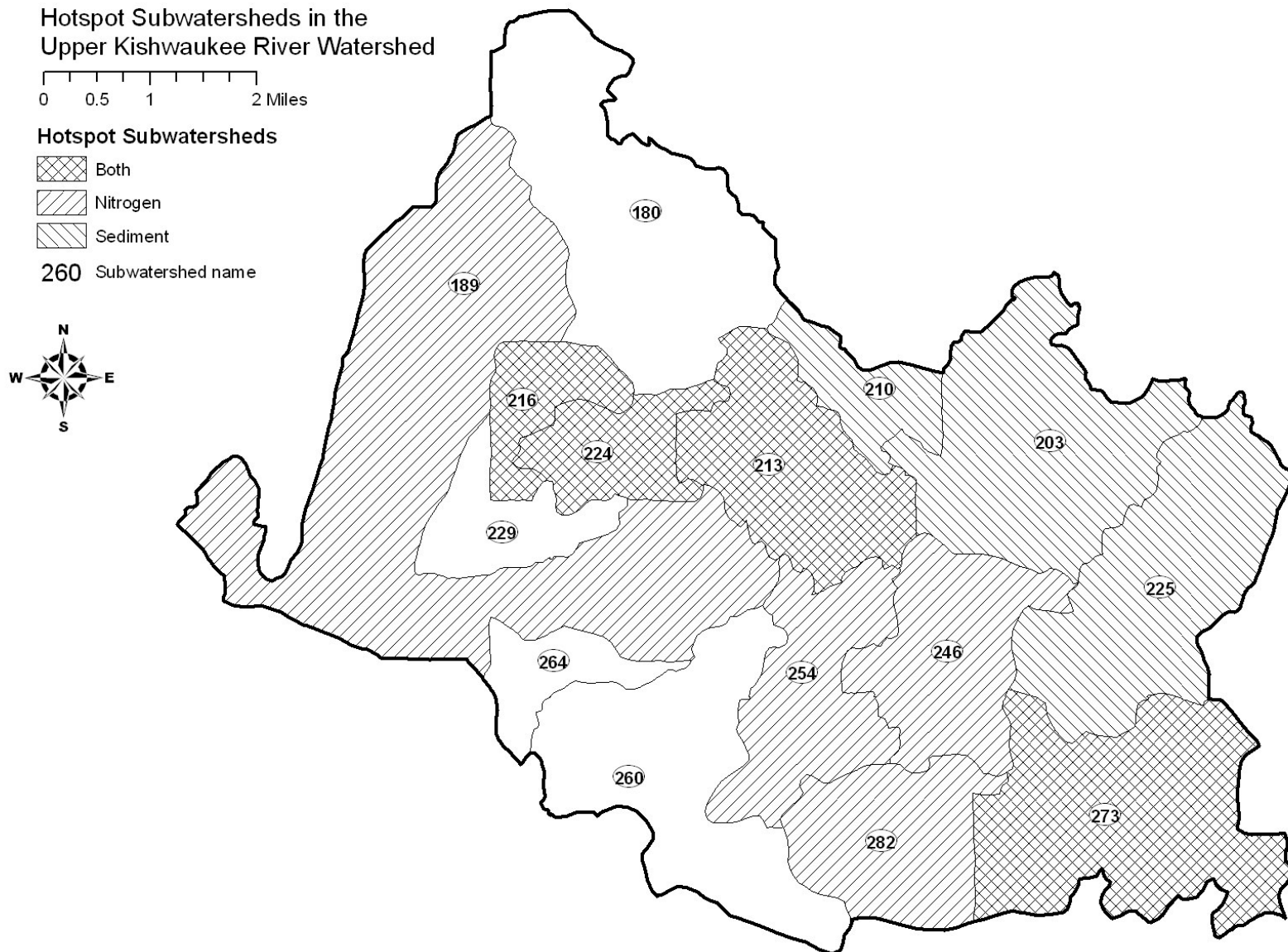
Proposal

- Reduce current loading of both nitrogen and sediment by 22%
- Prevent increase in *total* loading as watershed develops and wastewater flow increases
 - Projected 8% increase in nitrogen
 - Projected 7% increase in sediment

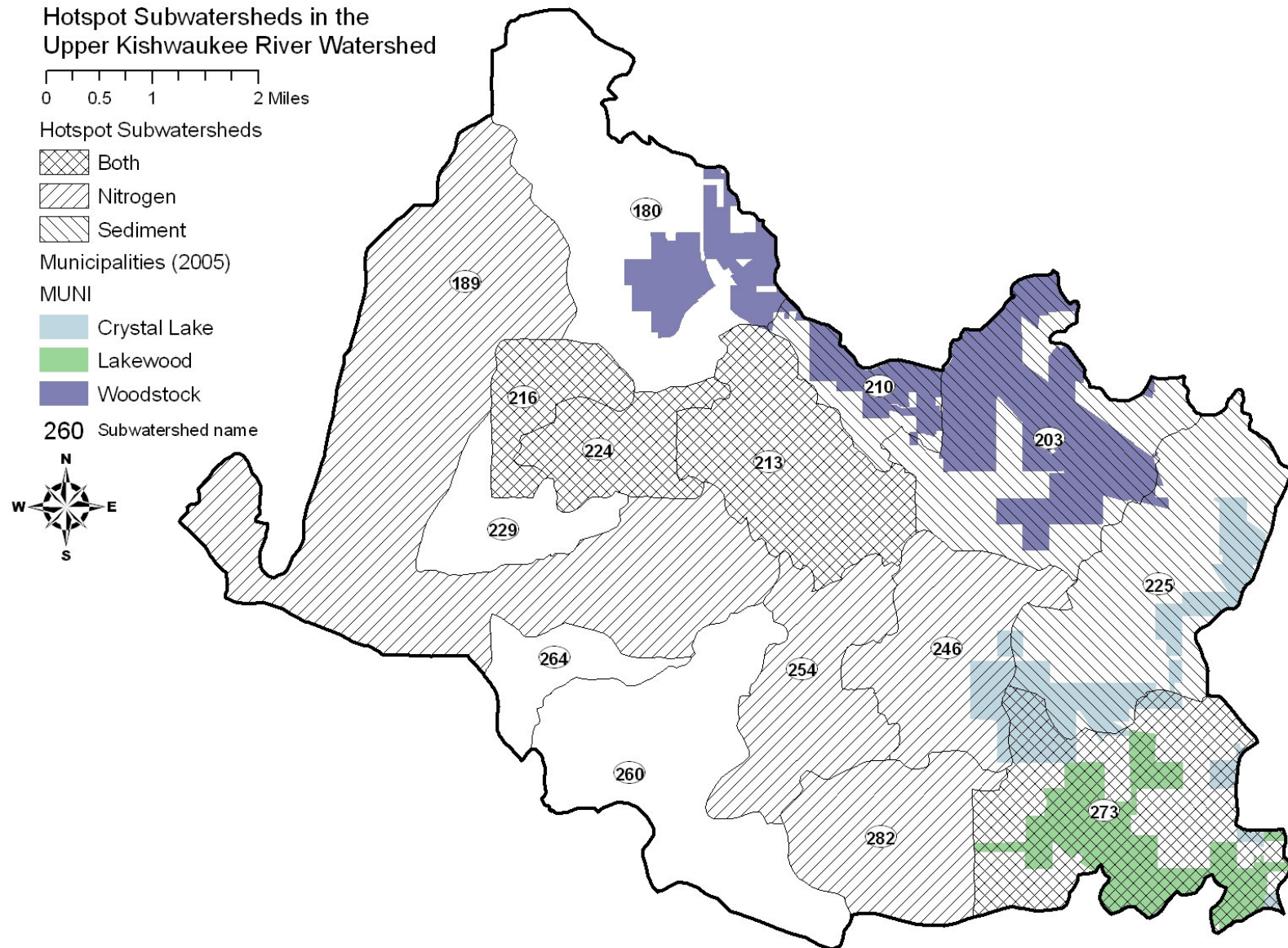
Proposal (con't)

- Distribution
 - 5.5% reduction by each of the municipalities and 5.5% by agriculture
 - Reduction in future loading by municipalities
- Next steps:
 - Find pollution reduction project opportunities
 - Collaborate with public works departments

Targets for current loading



Targets for current loading



Wastewater flows

	MGD	
	Woodstock	Lakewood
Current flow	1.17	0.31
Horizon year (~2030) design average flow	3.50	0.95

Contribution to sedimentation

	Total Suspended Solids		
	Woodstock	Lakewood	Total
Current avg (mg/L)	5.19	10.2	—
Current load (t/y)	9	6	15
Horizon yr load (t/y)	28	15	42

Contribution to total nitrogen

	Woodstock	Lakewood	Total
Ammonia			
Current concentration (mg/L)	0.11	0.75	—
Current load (lb/y)	381	852	1,233
Horizon yr load (lb/y)	1,130	2,167	3,297
Total Nitrogen			
Ratio Total N to NH3-N	15(3)	3	—
Est. current conc. (mg/L)	2	2	—
Estimated current load (lb/y)	5,675	2,108	7,783
Horizon yr load (lb/y)	3,390	6,502	9,891

Recommendation

- Woodstock should do biological nitrogen removal at the south treatment plant
 - Projection assumes that it will

Natural Area Conservation

- Two forms:
 - Riparian area
 - The “skeleton,” the “last line of defense”
 - Habitat protection for both terrestrial and aquatic species
 - Remaining “green infrastructure”